

## NOTES ON THE SLOW LEMURS.

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### INTRODUCTION.

The following notes are not intended as a critical revision of the Slow Lemurs, and the conclusions here arrived at can not be considered as final, but in studying the specimens of the genus *Nycticebus*<sup>a</sup> in the collection of the United States National Museum some interesting facts have been brought to light which seem worth recording.

For a consideration of the generic and specific names for the Slow Lemurs, the reader is referred to the Revision of the Genus *Nycticebus*, by Stone and Rehn.<sup>b</sup> All of the forms there recognized are here considered as valid and two others are described. Messrs. Stone and Rehn had but eight specimens at their disposal, but now, due to the activities of Dr. W. L. Abbott in the Malayan region, I have before me 23 specimens, 8 of which are all from one locality in western Borneo. Even this seemingly abundant material is altogether too scant for arriving at definite conclusions. Here I wish to express my obligations to Mr. Witmer Stone of the Philadelphia Academy of Natural Sciences for the use of two specimens from Sumatra and one from Java.

Most writers have placed considerable weight on color as a specific character, often from lack of material overlooking the wide range of variation in specimens from a given locality. The only attention

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<sup>a</sup>Dr. Menegaux, of the Paris Museum, in a letter to Mr. Gerrit S. Miller, jr., dated June 6, 1906, writes: "I have looked up that which you asked me concerning *Bradicebus*. The word is not cited in *Magasin encyclop. 1795, classification des Mammifères* by Geoffroy and Cuvier (in vol. II), although Gervais, apropos of the article on mammals, in the *Dict. Pittoresque d'Hist. Nat. et de phénom. de la nature*, vol. IV, p. 617, says textually 'Geoffroy and Cuvier published together in vol. VI (?) of the *Magasin encyclopédique* a classification of mammals, which we transcribe entire: . . . Cucang, *Bradicebus*; Khoyak, *Chirosciurus*; Tarsier, *Macrotarsus*.' . . . The citation of Gervais is given incorrectly." Translation.

<sup>b</sup>Proc. Acad. Nat. Sci. Phila., 1902, pp. 136-141.

paid to cranial characters seems to have been confined to the number of upper incisors. Before proceeding to a description of the species in the genus, it will be well to consider some characters of the Slow Lemurs as a whole.

#### PELAGE AND COLOR.

Two different types of hairs are found on the Slow Lemurs: (1) A very dense woolly crinkly coat, corresponding in general to what is known as the underfur in mammals, about 20 mm. in length, on middle of back; and (2), a set of longer hairs, much more scant than the dense woolly ones and from 5 to 10 mm. longer, being nearly straight throughout their length, slight crinkling taking place for a distance of 5 to 10 mm. along the middle. The woolly hairs are not found typically on the face, or on the hands and feet. These two sorts of hairs are not sharply defined types and many individual hairs are seen which are intermediate between the two.

The basal half or a little more of the woolly hairs is of a general slate-gray or almost plumbeous color, darker on the hairs of the back and lighter on those of the belly. Normally, this slaty color is never seen in the upper parts except on parting the thick coat, but on the underparts where the hairy covering is less dense a certain amount of the slaty or plumbeous color shows through. The distal half of the woolly hairs is about equally divided between two colors, a grayish or yellow-gray color next the slaty basal color, and terminally some sort of an ochraceous or buffy color, to which the general color of the animal is due. On the dark face marks when present and along the dorsal stripe the terminal color of the hairs is much darker, varying from a light, bright russet to a very dark brown.

The long straight hairs have little to do with the real general color effect. They seem to be very similar in color to the woolly hairs except at the tip, where there is a large white subterminal ring about 3 to 5 mm. wide. The apical ring is about 1 to 2 mm. wide and dark in color, which is not seen ordinarily and has no effect on the general color. The subterminal white ring, however, often apparently enters very largely into the general color scheme, and in case the hairs are long and their tips not worn produces a conspicuous frosting overlying the general ochraceous color of the upper parts. This frosted effect is most conspicuous in two specimens of *Nycticebus malaianus*, a two-thirds grown individual, Cat. No. 84390, U.S.N.M., from Trong, Lower Siam; and a young adult male, Cat. No. 114151, U.S.N.M., from Johore Lama. In an adult of unknown sex, Cat. No. 84389, U.S.N.M., from Trong, no frosting at all is present except a very slight amount on the upper part of the neck. Except for a few hairs on either side of the dark median stripe no frosting is seen in Cat. No. 142233, U.S.N.M., a young adult male from western Borneo. An adult male, Cat. No. 142234, U.S.N.M., also from western Borneo, shows nearly

as much frosting as Cat. No. 114151, U.S.N.M., from Johore Lama. Between the two extremes all intermediate conditions occur. It should be noted that the extremes are found in specimens from the same locality and in the case of Bornean specimens taken at the same time of year, one July 22 and the other August 15. The frosting is also independent of age.

The difference in general coloration in the series of skins from Borneo is very striking and presents two extremes or phases, between which there are all gradations. The apical color of the woolly hairs in the dullest, Cat. No. 142237 U.S.N.M., a very old adult male, is a little lighter than Ridgway's wood brown, while the brightest colored one, Cat. No. 142233 U.S.N.M., an adult male, is a color intermediate between Ridgway's ochraceous and tawny-ochraceous. It is probable that the same variation would be found in series from other localities were they available. The four skins from the Malay Peninsula show considerable difference in color, but not such extremes as in the case of the Bornean examples.

The dorsal stripe varies considerably in extent and color. In the Bornean series it runs from a rich dark brown similar to Ridgway's seal brown to a color intermediate between his chestnut and russet. In those specimens where it is darkest it is the best defined, while in the others its borders are not so sharp. The width of the stripe varies considerably. In some specimens it extends the whole length of the back, narrowest posteriorly, in others it gradually dies out along the lumbar region.

The head and face markings seem quite uniform in pattern, variations in shape and size apparently depend upon the manner of making up that part of the skin. The markings are produced by a double bifurcation of the dorsal stripe on the top of the head, the posterior pair of bifurcations extending to the ears and diffusing over the cheeks, the anterior pair to the eyes forming a complete circle around them. At the point of the double bifurcation a more or less distinct crown patch is seen. The color of these face-markings is in general concolor with that of the dorsal stripe, but the ring immediately around the eye is darker. In *Nycticebus cinereus* the face and head markings are apparently absent and they are nearly so in *N. coucang*.

#### SKULL AND TEETH.

Depending on the arrangement of the temporal ridges, the skulls of the Slow Lemurs fall into two groups, (1) those in which the ridges eventually meet in the middle line in old age forming a sagittal crest (see Plate XIII, figs. 5-8); and (2) those in which the temporal ridges do not meet in the middle line even in old age, but form two heavy lines parallel with each other, or nearly so, for a considerable distance on the top of the skull. (See Plate XIII, figs. 1-4.) This latter condition I have

seen only in the specimens from Borneo and Banka. The only available skull of a *Nycticebus* from Java is young, and it can not be positively stated whether the temporal ridges would meet in the middle line or whether they would develop heavy parallel ridges as in the Bornean form. The ridges on it, however, look more as they do in young of the species where a sagittal crest is formed than they resemble those in young Bornean examples. Plate XIII shows the progressive development of the two styles of temporal ridges.

There is a progressive increase in size of the skulls with increasing age, which is shown in both the Bornean and Malay Peninsula series. A full set of teeth is no criterion that an animal is fully adult, and only in very old age do the teeth show much wear. In comparing any two species, it is necessary to select individuals of the same age. (See table of measurements, p. 537, and Plate XIII.)

As noted by most writers, the number of upper incisors in the Slow Lemurs varies between two and four, the usual view being that the smaller outer pair are dropped in old age. An examination of the present material shows that the Bornean Slow Lemur never has but two upper incisors. Examination of a very young skull, Cat. No. 142240 U.S.N.M., probably a newborn individual, shows only two upper incisors and no possible place for the small lateral pair of incisors. A very young Sumatran skull, Cat. No. 141142 U.S.N.M., has four upper incisors, two adult Sumatran skulls have four, one adult two, and one adult three. A young Malayan skull, Cat. No. 84390 U.S.N.M., has three; all the other mainland skulls and the one from the Natunas show four upper incisors. In Anderson's Catalogue of Mammalia in the Indian Museum<sup>a</sup> it appears that the number of upper incisors is variable in the mainland species. In the Javan skull the premaxillæ are wanting and nothing can be told about the upper incisors. Anderson<sup>b</sup> and Milne-Edwards<sup>c</sup> state in Javan skulls the number may be either two, three, or four. It looks as if the Bornean form and possibly the one from Banka possess only two upper incisors, while in all the other forms four upper incisors are found, always in the young and often in the adults. If more material should show that this is the case and that it is correlated with the ununited temporal ridges, the Bornean and Bornean *Nycticebi* would form a distinct subgenus. For a tabulation of the number of upper incisors see table of measurements, page 537.

#### DESCRIPTION OF THE SPECIES OF SLOW LEMURS.

In the following account of the species I have made use of binomial names only as there does not appear to be sufficient material to work out intergradation satisfactorily. In general it may be stated that the

<sup>a</sup>Part I, pp. 95-97.

<sup>b</sup>Anderson, Western Yunnan Expedition, Zool. Results, 1879, p. 105.

<sup>c</sup>Milne-Edwards, Nouv. Archiv. du Museum, Bull., III, pp. 10, 11.

species included under A in the following key are closely related, and the same is true of those under C and C'.

Nachtrieb's name *menagensis*<sup>a</sup> for a Philippine Lemur, which he did not place in any genus, I have not considered, being unable to obtain further information regarding it than is given in the original description,<sup>b</sup> which is insufficient to determine its generic place, although it probably belongs to this genus or an allied one.

KEY TO THE SPECIES OF NYCTICEBUS.

- A. Temporal ridges not meeting or approximating each other in old age, but forming two parallel ridges on top of skull; no specimens, not even newborn young, show more than one incisor on each side of upper jaw.
- B. Mastoid and audital bullæ not inflated; half ring of bone forming outer and lower border of orbit, broad and heavy. Underparts whitish. Borneo.  
*borneanus.*
- B'. Mastoid and audital bullæ moderately inflated; half ring of bone forming outer and lower border of orbit, narrow and light. Underparts ochraceous buffy.  
Banka ..... *bancanus.*
- A'. Temporal ridges meeting or approximating each other in old age, eventually forming a sagittal crest on top of skull; most adults show two incisors on each side of upper jaw, and young always do.
- C. Lines from crown of head to eyes and ears only faintly marked or obsolete.  
Larger, greatest length of skull less than 63 mm.
- D. Lines from crown of head to eyes and ears practically obsolete; general color of head, neck, and anterior part of body clear gray. Siam and Cochin China ..... *cinereus.*
- D'. Lines from crown of head to eyes and ears present but indistinct; general color of head, neck, and anterior part of body not clear gray, merely lighter than general color of upper parts. Eastern Bengal and Burma.  
*coucang.*
- C'. Lines from crown of head to eyes and ears well marked and conspicuous.  
Smaller, greatest length of skull about 58 mm.
- E. Dorsal stripe bordered on either side, in neck and upper back, by a distinct gray area. Java ..... *javanicus.*
- E'. Dorsal stripe not bordered on either side in neck and upper back by a distinct gray area.
- F. General color of upper parts intense and rich; hands, feet, and ears dusky. Natuna islands ..... *natuna.*
- F'. General color of upper parts not so intense or rich; hands, feet, and ears not dusky.

<sup>a</sup>In a letter under date of June 7, 1906, Professor Nachtrieb writes: "I can not find out whether that specimen of *menagensis* ever reached Minneapolis or not . . . the account of the 'New Lemur' was not my account . . . Mr. Worcester, I think, was the author of the account printed . . . the idea of giving a specific name before having determined the generic name struck me as rather odd . . . lost boxes . . . possibly this lemur was in that lot."

According to the A. O. U. Code the Philippine Slow Lemur (if there is one) can not be considered as having a scientific name. See Canon XXXVIII, where a similar case is cited.

<sup>b</sup>Zool. Anzeiger, XV, 1892, p. 147.

- G. Size slightly smaller; greatest length of skull about 58 mm.; mastoid and audital bulke smooth, rounded, and rather inflated. Malay Peninsula, and lowlands of Sumatra ..... *malaianus*.
- G'. Size slightly larger; greatest length of skull about 61 mm.; mastoid and audital bulke irregularly grooved, not inflated. 1,500-3,000 feet in Sumatra. .... *hilleri*.

NYCTICEBUS COUCANG (Boddaert.)

1783. *Tardigradus coucang* BODDAERT, Elenchus animalium, p. 67 (Fide Stone and Rehn).
1812. *Nycticebus bengalensis* E. GEOFFROY, Ann. du Mus., XIX, p. 164.

*Distribution.*—The type locality is given by Stone and Rehn as Bengal. It probably ranges throughout Burma and eastern Bengal.<sup>a</sup>

*Diagnostic characters.*—Size large, greatest length of skull about 63 mm.; temporal ridges forming a sagittal crest in old age; upper incisors usually two on each side; face markings indistinct; face, neck, and forearms not conspicuously gray.

*Color.*—General color of upper parts of the single specimen at hand similar to Ridgway's buff, becoming dirty grayish about the head, neck, and underparts. Four face lines present but indistinct; dorsal stripe extending whole length of back, narrow, 5 to 10 mm. wide, generally similar to Ridgway's cinnamon.

*Skull and teeth.*—Skull large, temporal ridges meeting in age to form a sagittal crest. Upper incisors usually two on each side.

*Measurements.*—See table, page 537.

*Specimens examined.*—A mounted skin, Cat. No. 14290, U.S.N.M., and its skull, Cat. No. 21179, U.S.N.M., received by the U. S. National Museum in the flesh from Central Park, New York City, in April, 1884.

*Remarks.*—While no locality is known for the above specimen, yet it seems to agree in size and color with the specimens referred to by Blanford<sup>b</sup> as the large northern variety. It is distinctly different from Edwards's<sup>c</sup> plate of *cinereus*, and from any other specimens in the National Museum. It is generally lighter in color than Audebert's<sup>d</sup> plate.

NYCTICEBUS CINEREUS Milne-Edwards.

1867. *Nycticebus cinereus* MILNE-EDWARDS, Nouv. Archiv. du Mus., Bull., III, p. 11, pl. III.

*Distribution.*—Vicinity of Bangkok should probably be regarded as the type locality. Its range is given by Edwards as Siam and Cochin China.

*Diagnostic characters.*—Similar to *Nycticebus coucang*, but head, neck, and forearms clear gray and face markings obsolete.

<sup>a</sup> Blanford, Fauna British India, Mammalia, 1888, p. 46; and Anderson, Zool. Results Two Expeditions Western Yunnan, 1879, p. 101.

<sup>b</sup> Blanford, Fauna British India, Mammalia, 1888, p. 46.

<sup>c</sup> Milne-Edwards, Nouv. Archiv. Mus., Bull., III, pl. III.

<sup>d</sup> Audebert, Hist. Nat. des Singes et des Makis, 1800, pl. 1.

*Skull and teeth.*—Skull large, temporal ridges of the type forming a sagittal crest, although in the figure they have not yet met. Upper incisors two on a side.

*Measurements.*—See table, page 537.

*Specimens examined.*—None.

*Remarks.*—This species is usually regarded as the same as *Nycticebus soucang*, but the descriptions and figures of the two certainly make them appear distinct. Not much can be determined until good series from the type localities are examined.

#### NYCTICEBUS MALAIANUS (Anderson).

1881. *Nycticebus tardigradus* var. *malaiana* ANDERSON, Catalogue Mammals Indian Museum, I, p. 95.

*Distribution.*—Malay Peninsula and the coast regions of Sumatra.

*Diagnostic characters.*—Size small, face markings prominent, temporal ridges forming a crest in old age, audital and mastoid bullae moderately inflated, upper incisors usually two on a side.

*Color.*—General color of the upper parts ranges in different specimens from wood brown to a dark ochraceous buff; more or less frosting is caused by the subterminal white band of the long hairs. The dorsal stripe usually widest over the shoulders may extend the whole length of the back or gradually disappear in the lumbar region. In color it varies from a rich, deep brown similar to seal brown to a dark tawny. Face markings are conspicuous and concolor generally with the dorsal stripe. Underparts dirty pinkish or cream buff, the slaty bases of the hairs showing through.

*Skull and teeth.*—Temporal ridges meet to form a sagittal crest in old age. Upper incisors four in the young and usually in the adult, though they may be reduced to three or two; audital and mastoid bullae smooth, rounded, and moderately inflated.

*Measurements.*—See table, page 537.

*Specimens examined.*—Seven skins with skulls, five from the Malay Peninsula and two from the west coast of Sumatra, and one alcoholic from west coast of Sumatra.

*Remarks.*—One specimen, Cat. No. 84389, U.S.N.M., from Trong, Lower Siam, has a skull differing considerably from the others of the series. Its brain case is much depressed and the outer and upper walls of the orbit stand out and up from the rest of the skull much more than they do in the other specimens. The two Sumatran specimens, one from Tapanuli Bay and the other from Tarussan Bay, I am unable to associate with *Nycticebus hilleri* Stone and Rehn, which is a slightly larger animal and has less inflated and more furrowed bullae.

## NYCTICEBUS HILLERI (Stone and Rehn.)

1902. *Nycticebus coucang hilleri* STONE and REHN, Proc. Acad. Nat. Sci. Phila., March, 1902, issued June 4, 1902, p. 139.

*Distribution.*—Probably the mountainous regions of Sumatra, known only from the type locality, Batu Sangkar, Tanah Datar, Padangsche Bovenland, Sumatra.

*Diagnostic characters.*—Similar to *Nycticebus malaiianus*, but slightly larger, with audital and mastoid bullae not smooth, rounded and inflated, but irregularly grooved instead.

*Color.*—Of the two specimens examined one has a general wood-brown effect above with considerable frosting, and the other a very dull ochraceous. Dorsal stripe extends whole length of back but indistinct posteriorly, dark brown in color. Head markings dull russet, considerably obscured by grayish tips to hair. Underparts dirty buffy, slaty bases of hairs showing through.

*Skull and teeth.*—Skull nearly as large as that of *Nycticebus coucang*. Temporal ridges forming a crest in old age. Upper incisors, four in the young, two in adults. Mastoid and audital bullae irregularly wrinkled.

*Measurements.*—See table, page 537.

*Specimens examined.*—Two, the type and a paratype.

*Remarks.*—This species appears to be a larger mountainous form of *Nycticebus malaiianus*, from which it seems to differ but slightly.

## NYCTICEBUS NATUNÆ (Stone and Rehn.)

1902. *Nycticebus coucang natunæ* STONE and REHN, Proc. Acad. Nat. Sci., Phila., March, 1902, issued June 4, 1902, p. 140.

*Distribution.*—Island of Bunguran, North Natuna Islands.

*Diagnostic characters.*—Similar to *Nycticebus malaiianus*, but darker in color and with dusky hands, feet, and ears.

*Color.*—Upper parts generally similar to Ridgway's russet, a slight amount of frosting. Dorsal stripe extending entire length of back, but indistinct on rump, broadest over shoulders, dark brown, almost blackish in places; on crown of head and face markings, like Ridgway's burnt umber, but lighter; rings about eyes almost black. Underparts generally dark ochraceous buff except on throat which is grayish. Upper surfaces of hands and feet irregularly blotched with blackish, ears with brownish black.

*Skull and teeth.*—The skull of *Nycticebus natunæ* does not differ appreciably from skulls of *N. malaiianus*. The interorbital constriction is not so pronounced and the mastoid bullae are a little less inflated. Four incisors are present in the upper jaw.

*Measurements.*—See table, page 537.

*Specimens examined.*—One, the type, Cat. No. 104599, U.S.N.M.

*Remarks.*—This species appears as a slightly differentiated form of



*Nycticebus malainus*. While it is darker above and below than the average of the peninsular animals, yet this is probably within the limits of individual variation. The black blotching on the hands and feet is so irregular that it may be abnormal, a couple of blackish spots are also found on the forearms. The brownish coloring about the ears looks more normal.

#### NYCTICEBUS JAVANICUS E. Geoffroy.

1812. *Nycticebus javanicus* E. GEOFFROY, Ann. du Museum, XIX, p. 164.

*Distribution*.—Java.

*Diagnostic characters*.—A small light-colored species, with well-defined dorsal and face stripes, the dorsal stripe bordered by a distinct grayish area along neck and upper back.

*Color*.—Sides of body and lower back dirty-pinkish buff; underparts similar, but lighter; head, neck, and upper back dirty grayish; dorsal stripe well marked, most pronounced in middle of back, gradually disappearing on the rump, blackish brown along the middle, dull cinnamon posteriorly, darker cinnamon on the head; face markings a mixture of cinnamon and Isabella color, becoming light russet about the ears.

*Skull and teeth*.—The single skull is young and lacks the premaxilla. Temporal ridges appear to belong to the type that meet in old age to form a sagittal crest. Mastoid and audital bullae not inflated. According to Anderson and Milne-Edwards the number of upper incisors may be two, three, or four.

*Measurements*.—See table, page 537.

*Specimens examined*.—One, Cat. No. 6475, Acad. Nat. Sci. Phila. The specimen is labeled as having come from the Philadelphia Zoological Society, which throws some doubt on its really having come from Java.

*Remarks*.—The grayish color bordering the dark markings makes this species appear quite distinct in color from other island forms. With the exception of the well-defined face markings, the anterior part of the animal resembles quite closely Edward's figure of *Nycticebus cinereus*. Many authors have laid stress on the distinctness of the head markings in the Javan animal, but they are not more distinct than in many examples of other species except *N. coucang* and *N. cinereus*.

#### NYCTICEBUS BORNEANUS, new species.

*Type*.—Adult male, skin and skull, Cat. No. 142234, U.S.N.M., collected along the Sakaïam River, a tributary of the Kapuas River, Sanggau district, western Borneo, August 15, 1905, by Dr. W. L. Abbott. Original number 4322.

*Distribution*.—Western Borneo.

*Diagnostic characters*.—Temporal ridges never meeting to form a

sagittal crest; upper incisors, only two; outer and lower wall of orbit wide, about 7 mm.; bullæ not swollen, underparts grayish white.

*Color.*—Upper parts range from a light wood brown to a color between ochraceous and tawny ochraceous (type is of latter color, moderately frosted). Dorsal stripe and face marks range from a light, bright russet to a dark brown, similar to a dark burnt umber (latter color in the type). Dorsal stripe is widest in region of shoulder and gradually disappears on the rump or on lower back (as in the type). Underparts light grayish, irregularly spotted in two specimens (one the type), with a pinkish buff. Individuals may or may not be frosted, type moderately frosted.

*Skull and teeth.*—Temporal ridges never uniting to form a sagittal crest, forming instead two parallel ridges on top of skull. Never more than two upper incisors even in the very young; lower outer wall of orbit about 7 mm. wide, bullæ not swollen.

*Measurements.*—See table, page 537.

*Specimens examined.*—Seven skins with skulls and two alcoholics from western Borneo.

*Remarks.*—*Nycticebus borneanus* is very distinct and needs no comparison with any of the preceding species.

#### NYCTICEBUS BANCANUS, new species.

*Type.*—Adult female. Skin and skull, Cat. No. 124907, U.S.N.M., collected at Klabat Bay, Island of Banka, east of Sumatra, June 24, 1904, by Dr. W. L. Abbott. Original number 3432.

*Distribution.*—Island of Banka.

*Diagnostic characters.*—Like *Nycticebus borneanus*, but underparts darker, bullæ more inflated and lower outer rim of orbit narrow, about 3 mm. wide.

*Color.*—*Type:* Upper parts generally a color something between Ridgway's ochraceous-buff and ochraceous with practically no frosting; dorsal stripe something between a dark russet and tawny. Dorsal stripe not of the well-defined type, disappearing in the lumbar region. Face markings concolor with dorsal stripe. Underparts a mixture of grayish and ochraceous-buff.

*Skull and teeth.*—Skull similar to that of *Nycticebus borneanus*, but the mastoid bullæ are slightly more inflated and the outer and lower walls of the orbit are narrow, about 3 to 4 mm. wide, against 6 to 8 in *N. borneanus*. Upper incisors only two.

*Measurements.*—See table, page 537.

*Specimens examined.*—One, the type.

*Remarks.*—*Nycticebus bancanus* is apparently a well-marked offshoot of *N. borneanus*. The skin of the type and only specimen is practically indistinguishable from Cat. No. 142233, U.S.N.M., one of the paratypes of *N. borneanus*, but the narrowness of the outer and lower orbital wall in *N. borneanus* at once distinguishes the two species.

Measurements of the species of *Nycticebus*.

Species.	Cat. No.	Locality.	Sex.	Age.	Number of upper incisors.	Head and body.	Tail.	Hind foot.	Greatest length of skull.	Basal length.	Greatest width of skull.	Width of brain case above zygomata.	Front of earlobe to back of last upper molar.	Mandible condyle to front of symphysis.
<i>X. couang</i> .....	14290	Unknown.....	Male	Adult.....	1	a 380	.....	a 65	63.5	56.2	44.6	33.8	22.8	11
	21179	Near Bangkok.....	.....	do.....	4	.....	.....	.....	e 63	e 55	e 45.5	e 35	e 23.5	e 42
<i>X. cinereus</i> .....	84380	Lower Siam: Trong.....	Male	Young.....	3	a 220	.....	a 50	50	40.8	30.2	27.9	15.5	29.6
<i>X. malaitanus</i> .....	114151	Malay Peninsula: Johore Lama.....	Male	Nearly adult.....	4	a 280	10	a 60	56.4	46.5	37.5	31.4	19.8	35
Do.....	84389	Lower Siam: Trong.....	Female	Adult.....	4	a 300	.....	63	59.2	51.6	40	30.8	21.4	37.9
Do.....	116496	Pahang: Kumpang River.....	do	do.....	4	300	10	a 62	58.6	48.7	41.3	31.8	21	36.6
Do.....	105022	Malay Peninsula: Tringau.....	do	Old adult.....	1	305	13	a 61	59.6	51.5	41.1	30	21.5	38.8
Do.....	e 141142	Western Sumatra: Tarussau Bay.....	Male	Very young.....	1	205	8	40	43.2	34.8	26.4	26.2	.....	24.5
Do.....	141141	do.....	Female	Adult.....	4	300	17	64	57	48.2	39.5	31.4	20.8	36.5
Do.....	114460	Western Sumatra: Tapannil Bay.....	Male	Old adult.....	4	312	16	a 61	59	51.1	44.4	32.4	20.6	37.5
Do.....	f, d 6590	Sumatra: Padang, 1,500-3,000 feet.....	do	Adult.....	2	a 330	.....	a 62	61.9	51.8	45.2	32.3	21.8	35.6
<i>X. hilleri</i> .....	f, d 6591	do.....	Female	Nearly adult.....	3	a 280	.....	a 52	56.2	46	36.8	29	20.3	37.3
Do.....	d 104599	Bunguran, Natuna Islands.....	Male	Young adult.....	4	305	13	64	58.9	49.3	40.5	31.2	21.2	35.5
<i>X. natanicus</i> .....	f 6476	do.....	do	do.....	4	a 280	.....	a 55	b 57	.....	37.8	31.3	20.3	19
Do.....	e 142240	Western Borneo: Sanggau.....	do	Very young.....	2	140	5	27	.....	25.5	.....	.....	.....	32.6
<i>X. borneanus</i> .....	e 142235	Western Borneo: Kapuas River at mouth of Sakaliah.....	do	Nearly adult.....	2	300	10	58	.....	44.6	35.3	30	19.6	.....
Do.....	142238	Western Borneo: Sanggau.....	Female	Adult.....	2	273	13	60	53.7	45.6	37.5	30.5	19.6	33.2
Do.....	142239	do.....	do	do.....	2	268	14	62	53.8	44.4	36.6	30.2	19.2	33.4
Do.....	142232	Western Borneo: Landak River.....	Male	Old adult.....	2	277	18	61	56.1	46.7	37.4	30	20.5	35.7
Do.....	142233	Western Borneo: Kapuas River, Tyan.....	do	do.....	2	265	15	66	54.3	45.3	39.4	29.3	19.5	32.9
Do.....	142236	Western Borneo: Sanggau.....	do	do.....	2	284	11	66	53.7	46	38.7	29.5	19.7	34
Do.....	d 142234	Western Borneo: Sakaliah River, Sanggau district.....	do	Very old adult.....	2	293	12	67	55.6	46.8	42.1	30.3	19.4	37
Do.....	142237	Western Borneo: Sanggau.....	do	do.....	2	299	13	64	58.4	48.9	40.4	32.3	20.7	36.9
<i>X. borneanus</i> .....	d 124907	Bangka: Klabat Bay.....	Female	Adult.....	2	327	8	62	56.2	46.4	37.8	30	19.1	34.6

a Type.  
 e In alcohol.  
 f Coll. Philadelphia Academy of Natural Sciences.

a Measurements taken from the skin.  
 b Estimated.  
 c Measured from the figures of skull on plate III, Nonv. Archiv. du Museum, Bull. III.

## EXPLANATION OF PLATE XIII.

All figures about  $\frac{2}{3}$  natural size.

Figs. 1-4, *Nycticebus borneanus*, showing progressive increase in size, and the development of the temporal ridges with increasing age.

1. Adult female, Sanggau, western Borneo. Cat. No. 142238, U.S.N.M.
2. Adult female, Sanggau, western Borneo. Cat. No. 142239, U.S.N.M.
3. Old adult male, Tyan, Kapuas River, western Borneo. Cat. No. 142233, U.S.N.M.
4. Very old adult male, Sakaiam River, Sanggau district, western Borneo. Cat. No. 142234, U.S.N.M., type.

Figs. 5-8, *Nycticebus malaiamus*, showing progressive increase in size, and the development of the sagittal crest with increasing age.

5. Nearly adult male, Johore Lama, Malay Peninsula. Cat. No. 114151, U.S.N.M.
6. Adult female, Rumpin River, Pahang, Malay Peninsula. Cat. No. 115496, U.S.N.M.
7. Old adult female, Tringanu, Malay Peninsula. Cat. No. 105022, U.S.N.M.
8. Old adult male, Tapanuli Bay, western Sumatra. Cat. No. 114460, U.S.N.M.